5.4.12 Wildfire

This section provides a profile and vulnerability assessment for the wildfire hazard.

Hazard Profile

This section provides profile information including description, location, extent, previous occurrences and losses and the probability of future occurrences.

Description

According to the New York State Hazard Mitigation Plan (NYS HMP), wildfire is defined as an uncontrolled fire spreading through natural or unnatural vegetation that often has the potential to threaten lives and property if not contained. Wildfires that burn in or threaten to burn buildings and other structures are referred to as wildland urban interface fires. Wildfires include common terms such as forest fires, brush fires, grass fires, wildland urban interface fires, range fires or ground fires. Wildfires do not include those fires, either naturally or purposely ignited, that are controlled for a defined purpose of managing vegetation for one or more benefits (NYS DHSES, 2011).

Wildfire in New York State is based on the same science and environmental factors as any wildfire in the world. Fuels, weather, and topography are the primary factors that determine the natural spread and destruction of every wildfire. New York State, including Suffolk County, has large tracts of diverse forest lands, many of which are the result of historic destructive wildfires. Although destructive fires do not occur on an annual basis, the State's fire history shows a cycle of fire occurrence that result in human death, property loss, forest destruction, and air pollution (NYS DHSES, 2011).

There are three different classes of wildfires: surface fires, ground fires, and crown fires. Surface fires are the most common type and burns along the forest floor, moving slowly and killing or damaging trees. Ground fires are usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees.

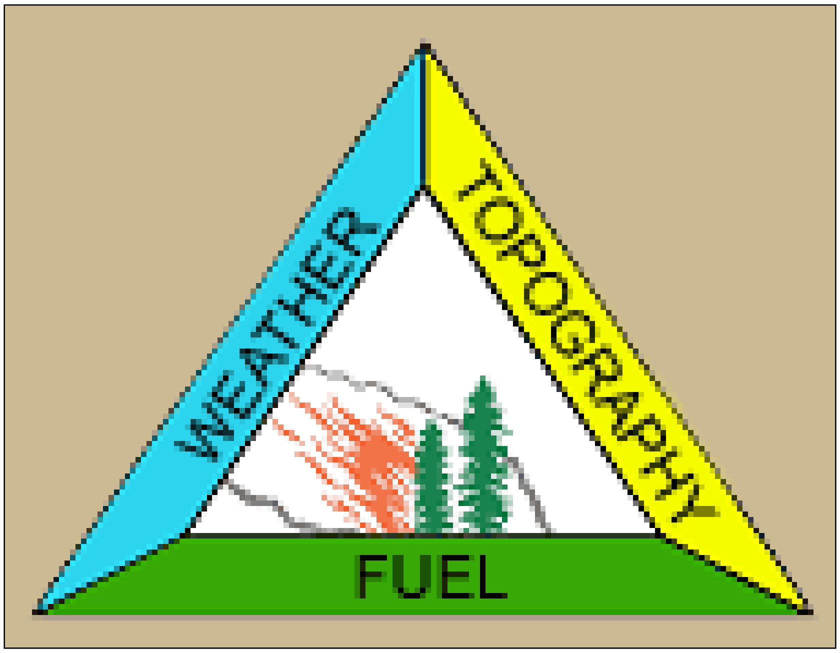
FEMA indicates that there are four categories of wildfires that are experienced throughout the U.S. These categories are defined as follows:

- Wildland fires – fueled almost exclusively by natural vegetation. They typically occur in national forests and parks, where Federal agencies are responsible for fire management and suppression.
- Interface or intermix fires – urban/wildland fires in which vegetation and the built-environment provide fuel
- Firestorms – events of such extreme intensity that effective suppression is virtually impossible. Firestorms occur during extreme weather and generally burn until conditions change or the available fuel is exhausted.
- Prescribed fires and prescribed natural burns – fires that are intentionally set or selected natural fires that are allowed to burn for beneficial purposes (FEMA, 1997).

Fire Ecology and Wildfire Behavior

Fire behavior is one of the most important aspects of wildfires because almost all actions taken on a fire depend on how it behaves. Success in pre-suppression planning and actual suppression of wildfires is directly related to how well fire managers understand and are able to predict fire behavior. Fire behavior is defined as the manner in which fuel ignites, flame develops, and fire spreads as determined by the interaction of fuel, weather and topography. The wildfire behavior triangle (Figure 5.4.12-1) illustrates how each these factors influence wildfire.

Figure 5.4.12-1.Wildfire Behavior Triangle



Source: USDA Forest Service, Date Unknown

The potential for wildfire, and its subsequent development (growth) and severity, is determined by the three principal factors (topography, fuel and weather). These factors are described below:

Topography - Topography can have a powerful influence on wildfire behavior. The movement of air over the terrain tends to direct a fire's course. Gulches and canyons can funnel air and act as a chimney, intensifying fire behavior and inducing faster spread rates. Saddles on ridgetops tend to offer lower resistance to the passage of air and will draw fires. Solar heating of drier, south-facing slopes produces upslope thermal winds that can complicate behavior.

Slope is an important factor. If the percentage of uphill slope doubles, the rate at which the wildfire spreads will most likely double. On steep slopes, fuels on the uphill side of the fire are closer physically to the source of heat. Radiation preheats and dries the fuel, thus intensifying fire behavior. Terrain can inhibit wildfires: fire travels downslope much more slowly than it does upslope, and ridgetops often mark the end of wildfire's rapid spread (FEMA, 1997).

Fuel - Fuels are classified by weight or volume (fuel loading) and by type. Fuel loading can be used to describe the amount of vegetative material available. If this doubles, the energy released can also be expected to double. Each fuel type is given a burn index, which is an estimate of the amount of potential energy that may be released, the effort required to obtain a fire in a given fuel, and the expected flame length. Different fuels have different burn qualities and some burn more easily than others. Grass releases relatively little energy but can sustain very high rates of spread (FEMA, 1997). According to the U.S. Forest Service, a forest stand may consist of several layers of live and dead vegetation in the understory (surface fuels), midstory (ladder fuels), and overstory (crown fuels). Fire behavior is strongly influenced by these fuels. Each of these layers provides a different type of fuel source for wildfires.

- Surface fuels consist of grasses, shrubs, litter, and woody material lying on the ground. Surface fires burn low vegetation, woody debris, and litter. Under the right conditions, surface fires reduce the likelihood that future wildfires will grow into crown fires.
- Ladder fuels consist of live and dead small trees and shrubs; live and dead lower branches from larger trees, needles, vines, lichens, mosses, and any other combustible biomass located between the top of the surface fuels and the bottom of the overstory tree crowns.
- Crown fuels are suspended above the ground in treetops or other vegetation and consists mostly of live and dead fine material. When historically low-density forests become overcrowded, tree crowns may merge and form a closed canopy. Tree canopies are the primary fuel layer in a forest crown fire (U.S. Forest Service, 2003).

Weather / Air Mass - Weather is the most important factor in the make-up of a fire's environment, yet it is always changing. Air mass, which is defined by the National Weather Service (NWS) as a body of air covering a relatively wide area and exhibiting horizontally uniform properties, can impact wildfire through climate, including temperature and relative humidity, local wind speed and direction, cloud cover, precipitation amount and duration, and the stability of the atmosphere at the time of the fire (NWS, 2009). Extreme weather leads to extreme events and it is often a moderation of the weather that marks the end of a wildfire's growth and the beginning of successful containment. High temperatures and low humidity can produce vigorous fire activity. Fronts and thunderstorms can produce winds that are capable of radical and sudden changes in speed and direction, causing similar changes in fire activity. The rate of spread of a fire varies directly with wind velocity. Winds may play a dominant role in directing the course of a fire. The most damaging firestorms are typically marked by high winds (FEMA, 1997).

Extent

The extent (that is, magnitude or severity) of wildfires depends on weather and human activity. There are several tools available to estimate fire potential, extent, danger and growth including, but not limited to the following:

Wildland/Urban Interface (WUI) is the area where houses and wildland vegetation coincide. Interface neighborhoods are found all across the U.S., and include many of the sprawling areas that grew during the 1990s. Housing developments alter the structure and function of forests and other wildland areas. The outcomes of the fire in the WUI are negative for residents; some may only experience smoke or evacuation, while others may lose their homes to a wildfire. All states have at least a small amount of land classified as WUI. To determine the WUI, structures per acre and population per square mile are used. Across the U.S., 9.3-percent of all land is classified as WUI. The WUI in the area is divided into two categories: intermix and interface. Intermix areas have more than one house per 40 acres and have more than 50-percent vegetation. Interface areas have more than one house per 40 acres, have less than 50-percent vegetation, and are within 1.5 miles of an area over 1,235 acres that is more than 75-percent vegetated (Stewart et al., 2006).

Concentrations of WUI can be seen along the east coast of the U.S., where housing density rarely falls below the threshold of one housing unit per 40 acres and forest cover is abundant. In the mid-Atlantic and north central regions of the U.S., the areas not dominated by agriculture have interspersed WUI and low density vegetated areas. Areas where recreation and tourism dominate are also places where WUI is common, especially in the northern Great Lakes and Missouri Ozarks (Stewart et al., 2006).

Wildland Fire Assessment System (WFAS) is an internet-based information system that provides a national view of weather and fire potential, including national fires danger, weather maps and satellite-derived "greenness" maps. It was developed by the Fire Behavior unit at the Fire Sciences Laboratory in Missoula, Montana and is currently supported and maintained at the National Interagency Fire Center (NIFC) in Boise, Idaho (USFS, Date Unknown).

Each day during the fire season, national maps of selected fire weather and fire danger components of the National Fire Danger Rating System (NFDRS) are produced by the WFAS (USFS, Date Unknown). Fire Danger Rating level takes into account current and antecedent weather, fuel types, and both live and dead fuel moisture. This information is provided by local station managers (USFS, Date Unknown). Table 5.4.12-1 shows the fire danger rating and color code.

Table 5.4.12-1. Fire Danger Rating and Color Code

Fire Danger Rating and Color Code	Description
Low (L) (Dark Green)	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate (M) (Light Green or Blue)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
High (H) (Yellow)	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High (VH) (Orange)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E) (Red)	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash (trunks, branches, and tree tops) or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

Source: USFS, Date Unknown

The ***Fire Potential Index (FPI)*** is derived by combining daily weather and vegetation condition information and can identify the areas most susceptible to fire ignition. The combination of relative greenness and weather information identifies the moisture condition of the live and dead vegetation. The weather information also identifies areas of low humidity, high temperature, and no precipitation to identify areas most susceptible to fire ignition. The FPI enables local and regional fire planners to quantitatively measure fire ignition risk (USGS, 2005). FPI maps are provided on a daily basis by the U.S. Forest Service. The scale ranges from 0 (low) to 100 (high). The calculations used in the NFDRS are not part of the FPI, except for a 10-hour moisture content (Burgan et al, 2000).

Fuel Moisture (FM) content is the quantity of water in a fuel particle expressed as a percent of the oven-dry weight of the fuel particle. FM content is an expression of the cumulative effects of past and present weather events and must be considered in evaluating the effects of current or future weather on fire potential. FM is computed by dividing the weight of the "water" in the fuel by the oven-dry weight of the fuel and then multiplying by 100 to get the percent of moisture in a fuel (Burgan et al, 2000).

There are two kinds of FM: live and dead. Live fuel moistures are much slower to respond to environmental changes and are most influenced by things such as a long drought period, natural disease and insect infestation, annuals curing out early in the season, timber harvesting, and changes in the fuel models due to blow down from windstorms and ice storms (Burgan et al, 2000). Dead fuel moisture is the moisture in any cured or dead plant part, whether attached to a still-living plant or not. Dead fuels absorb moisture through physical contact with water (such as rain and dew) and absorb water vapor from the atmosphere. The drying of dead fuels is accomplished by evaporation. These drying and wetting processes of dead fuels are such that the moisture content of these fuels is strongly affected by fuel sizes, weather, topography, decay classes, fuel composition, surface coatings, fuel compactness and arrangement (Schroeder and Buck, 1970).

Fuels are classified into four categories which respond to changes in moisture. This response time is referred to as a time lag. A fuel's time lag is proportional to its diameter and is loosely defined as the time it takes a fuel particle to reach two-thirds of its way to equilibrium with its local environment. The four categories include:

- 1-hour fuels: up to ¼-inch diameter – fine, flashy fuels that respond quickly to weather changes. Computed from observation time, temperature, humidity, and cloudiness.
- 10-hour fuels: ¼-inch to one-inch in diameter - computed from observation time, temperature, humidity, and cloudiness or can be an observed value.
- 100-hour fuels: one-inch to three-inch in diameter - computed from 24-hour average boundary condition composed of day length (daylight hours), hours of rain, and daily temperature/humidity ranges.
- 1000-hour fuels: three-inch to eight-inch in diameter - computed from a seven-day average boundary condition composed of day length, hours of rain, and daily temperature/humidity ranges (National Park Service, Date Unknown).

The ***Keetch-Byram Drought Index (KBDI)*** is a drought index designed for fire potential assessment. It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers (USFS, Date Unknown). The index increases each day without rain and decreases when it rains. The scale ranges from 0 (no moisture deficit) to 800 (maximum drought possible). The range of the index is determined by assuming that there is eight inches of moisture in a saturated soil that is readily available to the vegetation. For different soil types, the depth of soil required to hold eight inches of moisture varies. A prolonged drought influences fire intensity, largely because more fuel is available for combustion. The drying of organic material in the soil can lead to increased difficulty in fire suppression (Florida Forest Service, Date Unknown).

The ***Haines Index***, also known as the Lower Atmosphere Stability Index, is a fire weather index based on stability and moisture content of the lower atmosphere that measures the potential for existing fires to become large fires. It is named after its developer, Donald Haines, a Forest Service research meteorologist, who did the initial work and published the scale in 1988 (Storm Prediction Center [SPC], Date Unknown).

The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the index. It is calculated by combining the stability and moisture content to the lower atmosphere into a number that correlates well with large fire growth. The stability term is determined by the temperature difference between two atmospheric layers; the moisture term is determined by the temperature and dew point different. The index, as listed below, has shown to correlate with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior (USFS, Date Unknown).

- Very Low Potential (2) – moist, stable lower atmosphere
- Very Low Potential (3)
- Low Potential (4)
- Moderate Potential (5)
- High Potential (6) – dry, unstable lower atmosphere (USFS, Date Unknown)

The Haines Index is intended to be used all over the U.S. It is adaptable for three elevation regimes: low elevation, middle elevation, and high elevation. Low elevation is for fires at or very near sea level. Middle elevation is for fires burning in the 1,000 to 3,000 feet in elevation range. High elevation is intended for fires burning above 3,000 feet in elevation (SPC, Date Unknown).

The ***Landscape Fire and Resource Management Planning Tools Project (LANDFIRE)*** is a five-year, multi-partner project. The project is producing comprehensive and consistent maps and data describing vegetation, fire and fuel characteristics for the entire U.S. LANDFIRE is a shared project between the U.S. Department of Agriculture Forest Service and the U.S. Department of the Interior. The project has several principal partners, which include the USFS Missoula Fire Sciences Laboratory, the USGS Center for Earth Resources Observation and Science, and the Nature Conservancy (LANDFIRE, Date Unknown).

Additionally, the U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station developed a historical natural fire regimes dataset. The fire regimes are described in terms of frequency and severity and represent pre-settlement, historical fire processes. Fire regimes I and II represent frequent fire return intervals. The 0-35+ years/low severity fire regime (I) occurs mostly on forested land. The 0-35+years/stand-replacement regime (II) occurs mostly on grasslands and shrublands. Fire regimes III, IV, and V have longer fire return intervals and occur on forest lands, shrublands, and grasslands. These coarse-scale data were developed for national-level planning and were not intended to be used at finer spatial scales (Schmidt et al., 2002).

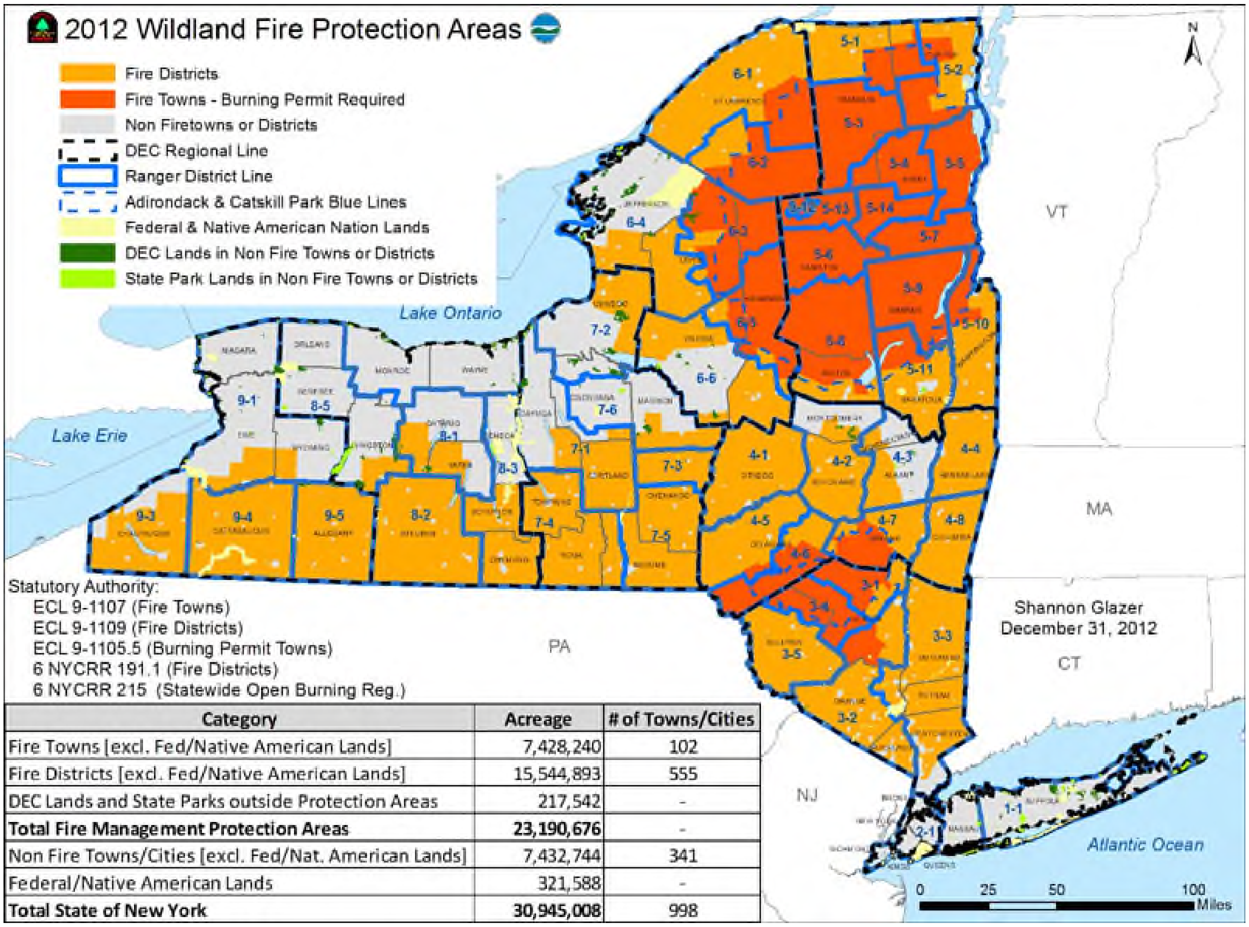
The ***Buildup Index (BUI)*** is a number that reflects the combined cumulative effects of daily drying and precipitation in fuels with a 10 day time lag constant. The BUI can represent three to four inches of compacted litter or can represent up to six inches or more of loose litter (North Carolina Forest Service, 2007).

Location

According to the U.S. Fire Administration (USFA), the fire problem in the U.S. varies from region to region. This often is a result of climate, poverty, education, demographics, and other causal factors (USFA, 2013). Wildfires do occur in New York State. Many areas in the State, particularly those that are heavily forested or contain large tracts of brush and shrubs, are prone to fires. New York State has over 18 million acres of non-Federal forested land, along with an undetermined amount of open space and wetlands. The Adirondacks, Catskills, Hudson Highlands, Shawangunk Ridge, and Long Island Pine Barrens are examples of fire-prone areas (NYSDEC, 2013).

In New York State, the NYSDEC's Division of Forest Protection (Forest Ranger Division) is designated as the State's lead agency for wildfire mitigation. The Forest Ranger Division has a statutory requirement to provide a forest fire protection system for 657 of the 932 jurisdictions throughout New York State. It includes cities and villages and cover 23.1 million acres of land, including all state-owned land outside of the jurisdictions. The Lake Ontario Plains and New York City-Long Island areas are the general areas not included in the statutory requirement. Figure 5.4.12-2 displays the fire protection areas in New York State. This figure indicates that, as of 2010, Suffolk County is not part of the wildfire protection area.

Figure 5.4.12-2. Forest Ranger Division Wildfire Protection Areas

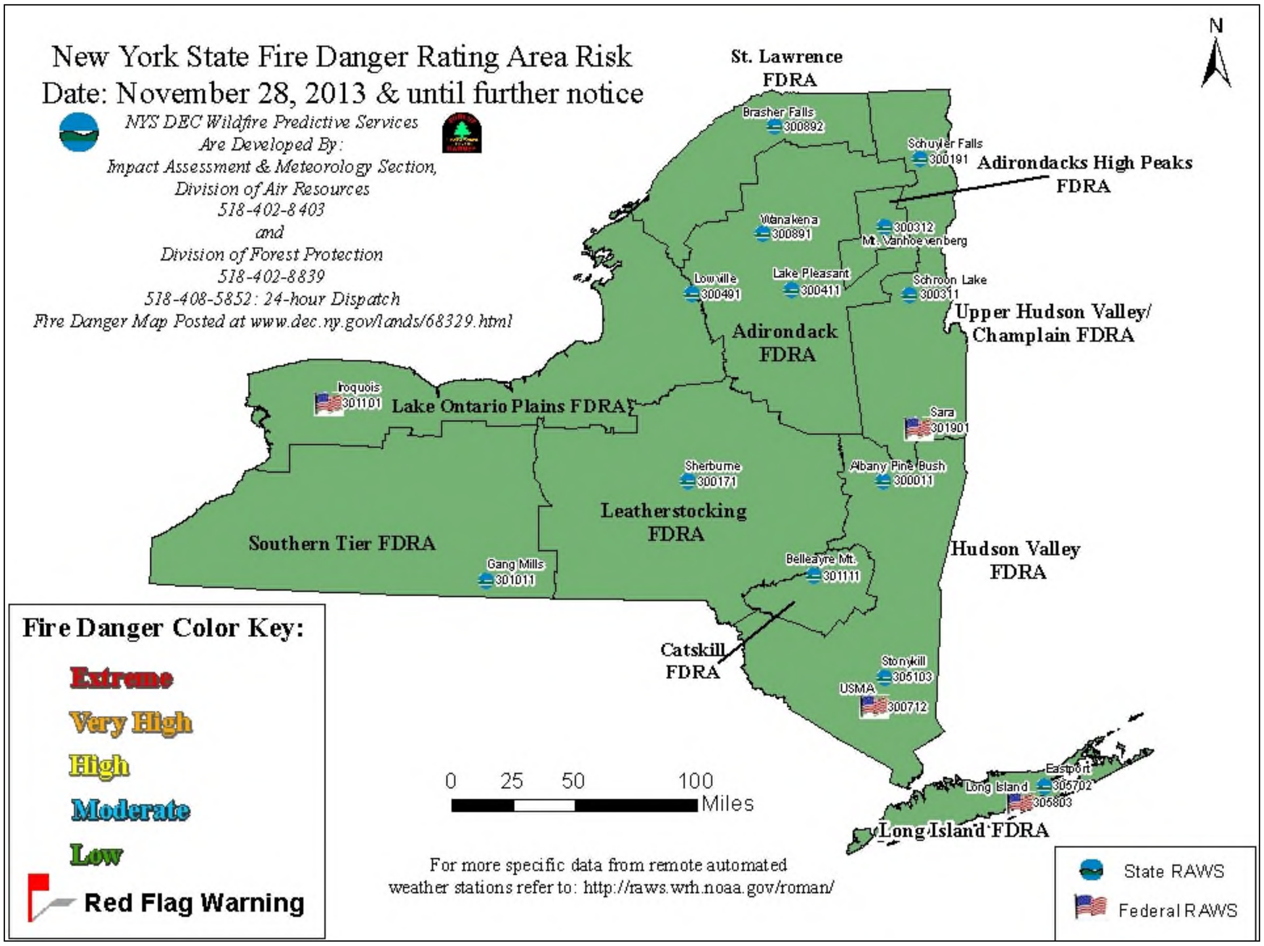


Category	Acreage	# of Towns/Cities
Fire Towns [excl. Fed/Native American Lands]	7,428,240	102
Fire Districts [excl. Fed/Native American Lands]	15,544,893	555
DEC Lands and State Parks outside Protection Areas	217,542	-
Total Fire Management Protection Areas	**23,190,676**	-
Non Fire Towns/Cities [excl. Fed/Nat. American Lands]	7,432,744	341
Federal/Native American Lands	321,588	-
Total State of New York	**30,945,008**	998

Source: NYSDEC, 2012

New York State is divided into 10 fire danger rating areas (FDRAs). FDRAs are defined by areas of similar vegetation, climate, and topography in conjunction with agency regional boundaries, National Weather Service (NWS) fire weather zones, political boundaries, fire occurrence history, and other influences. The Forest Ranger Division issues daily fire danger warnings when the fire danger rating is at high or above in one or more FDRAs. A current fire danger rating map is updated daily on the NYSDEC website. Figure 5.4.12-3 shows the FDRAs in New York State and the current fire danger risk for each of the areas.

Figure 5.4.12-3. New York State Fire Danger Rating Areas



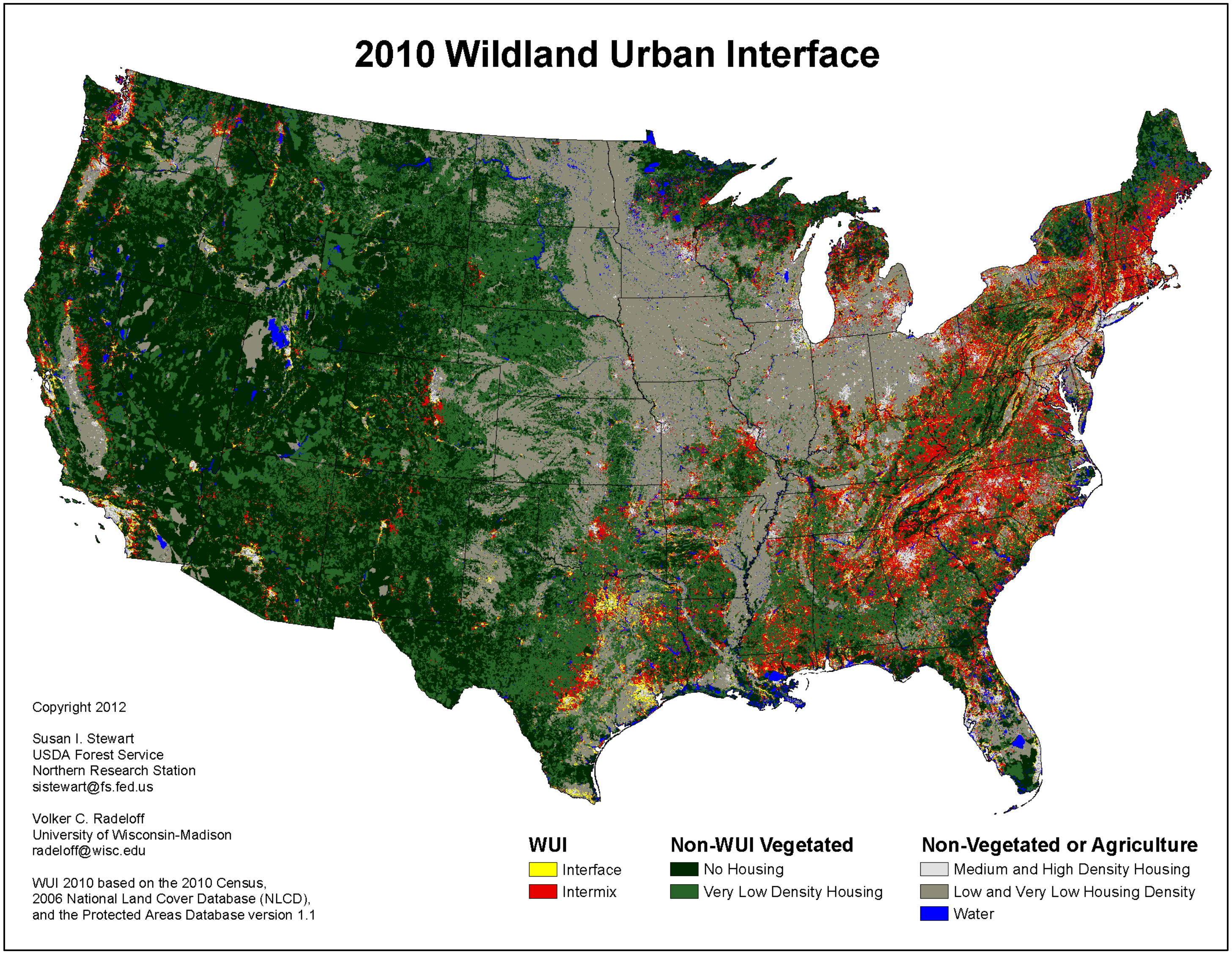
Source: NYSDEC, 2013

Wildfire/Urban Interface (WUI) in New York State/Suffolk County

As previously defined, the NYS HMP indicates that New York State has all three types of WUI interfaces. The Adirondack and Catskill Mountains contain large tracts of forests with the mixed, and to a lesser extent, the classic interface occurring throughout. The remainder of the State contains classic and mixed interfaces with some major cities containing an occluded interface. The population migration from an urban to suburban and rural living will continue, increasing the possibility of loss and/or damage to structures in the WUI. Many property owners are unaware that a threat from a wildfire exists or that their homes are not defensible from it. Water supplies at the scene in the WUI are often inadequate. Access by firefighting equipment is often blocked or hindered by driveways that are either narrow, winding, dead-ended, have tight turning radii or have weight restrictions. Most wildland fire suppression personnel are inadequately prepared for fighting structural fires and local fire departments are not usually fully-trained or equipped for wildfire suppression. Further, the mix of structures, ornamental vegetation and wildland fuels may cause erratic fire behavior. These factors and others substantially increase the risk to life, property and economic welfare in the WUI. While there are many interface communities throughout New York and Suffolk County, an official list that details the location, type of interface and surrounding fuel make-up does not exist (NYS DHSES, 2011).

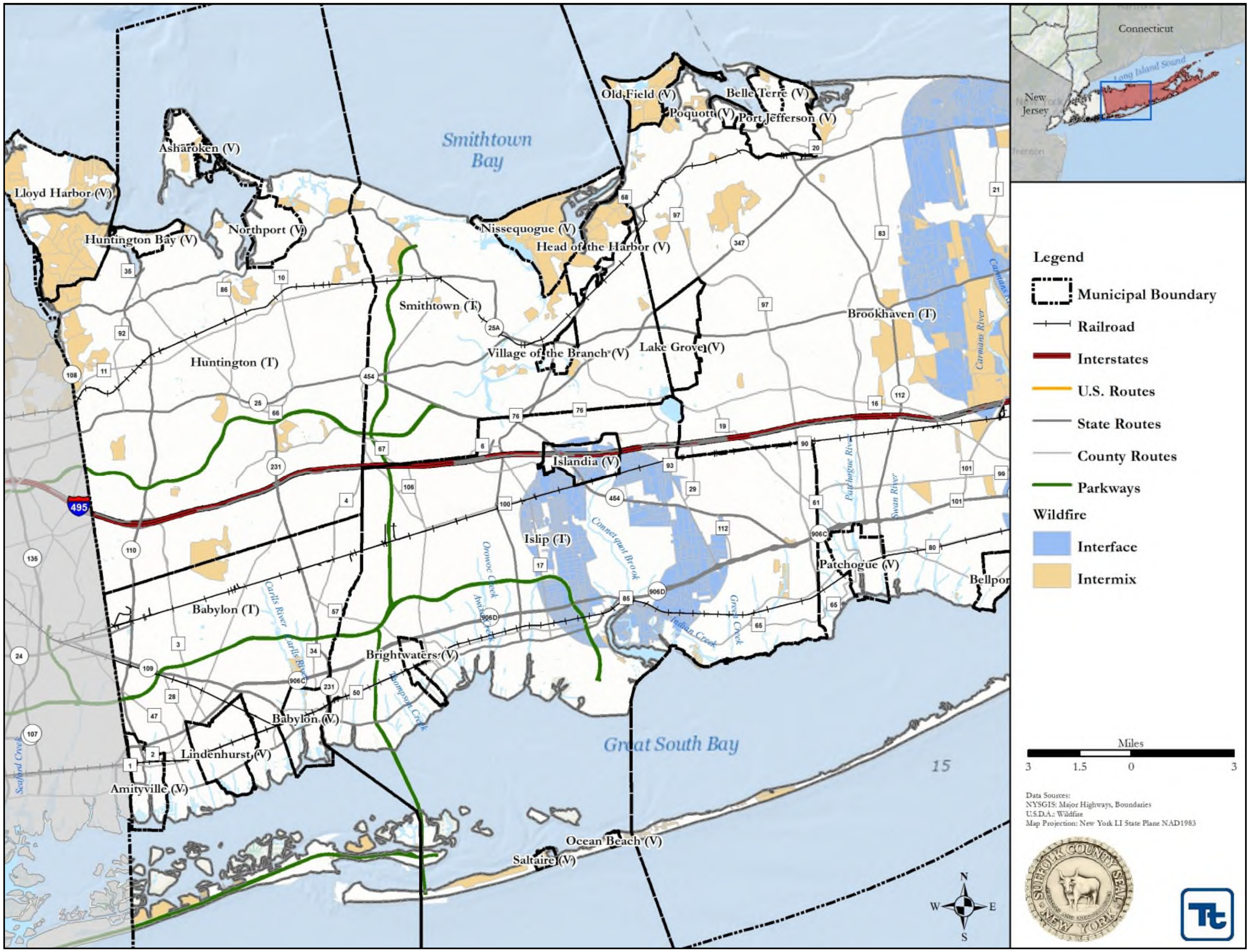
A detailed WUI (interface and intermix) was obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison which also defines the wildfire hazard area. The California Fire Alliance determined that areas within 1.5 miles of wildland vegetation are the approximate distance that firebrands can be carried from a wildland fire to the roof of a house. Therefore, even structures not located within the forest are at risk to wildfire. This buffer distance, along with housing density and vegetation type were used to define the WUI illustrated in Figure 5.4.12-4 below (Radeloff, et al, 2005). Using this WUI, approximately 279 square miles or approximately 30-percent of the County's land area is located in the WUI (interface and intermix).

Figure 5.4.12-4. SILVIS Wildland Urban Interface across the United States



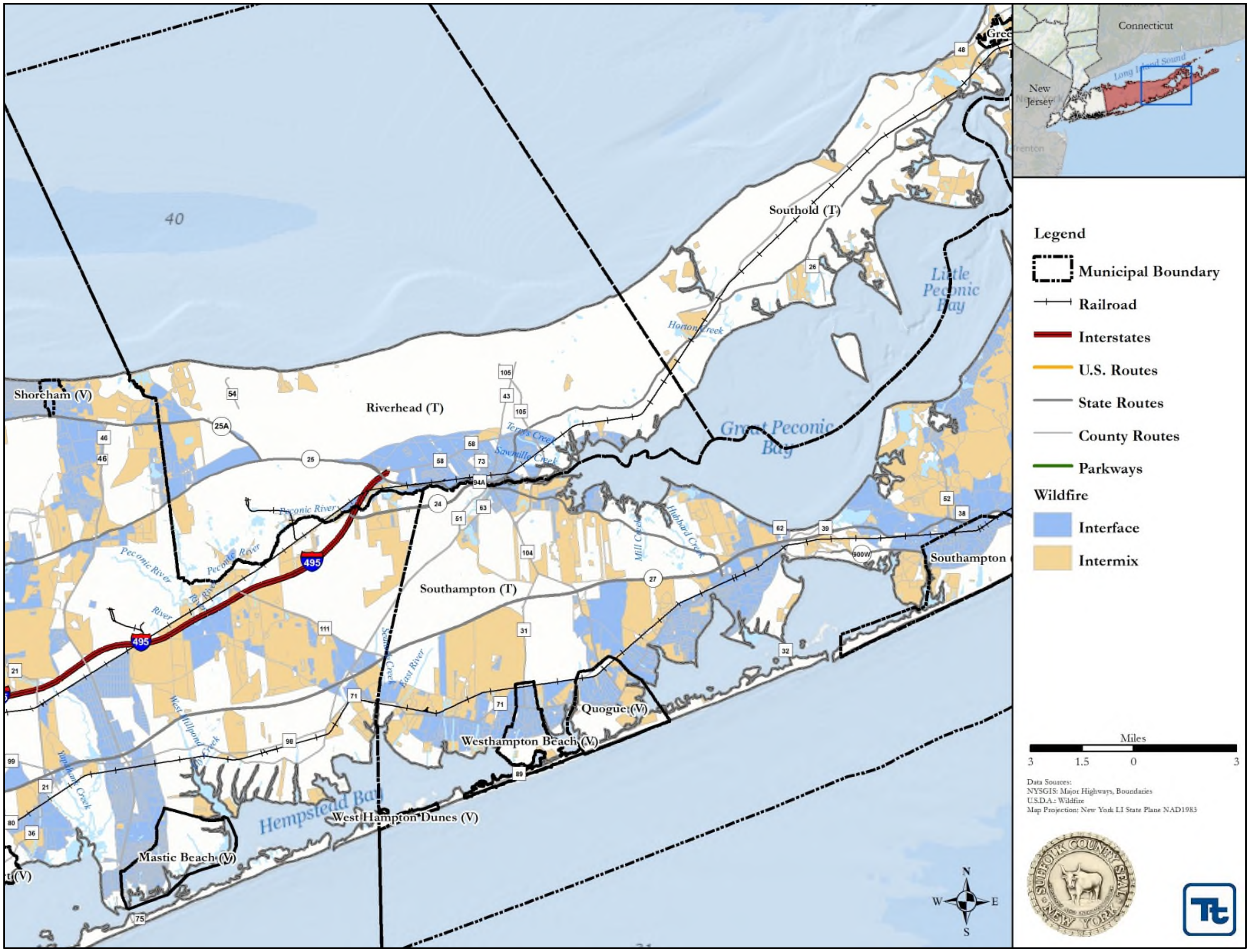
Source: Radeloff et al, 2005

Figure 5.4.12-5. SILVIS Wildland Urban Interface in Suffolk County - West



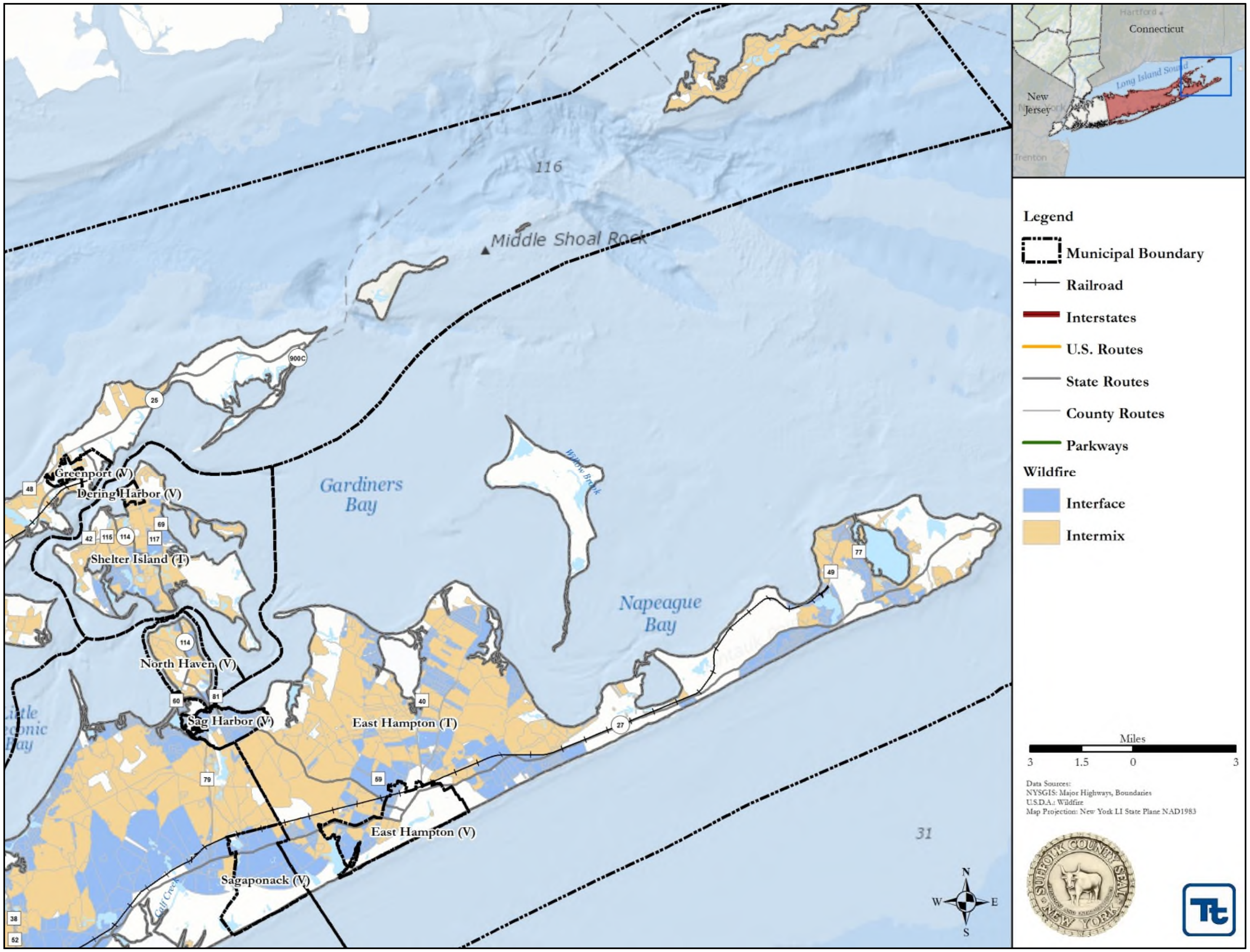
Source: Radeloff et al, 2005

Figure 5.4.12-6. SILVIS Wildland Urban Interface in Suffolk County - Central



Source: Radeloff et al, 2005

Figure 5.4.12-7. SILVIS Wildland Urban Interface in Suffolk County - East

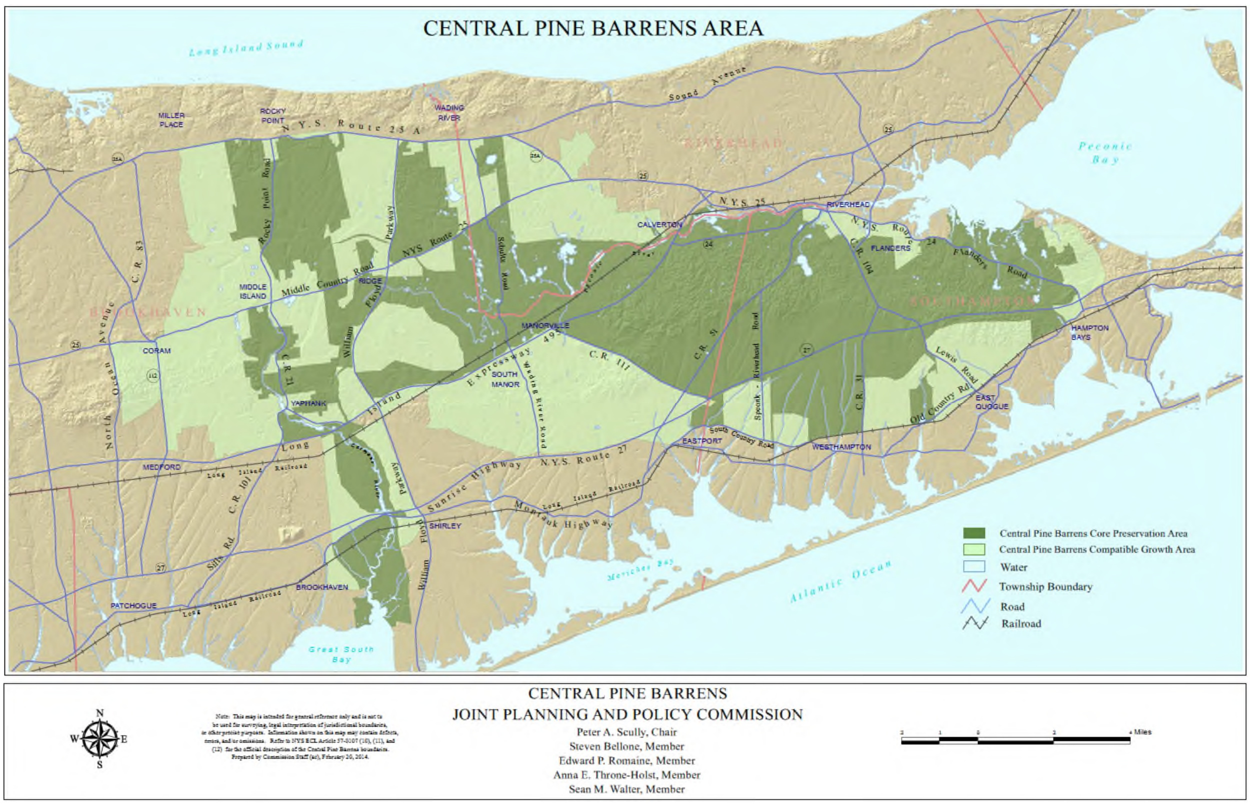


Source: Radeloff et al, 2005

Central Pine Barrens

The Central Pine Barrens on Long Island is a forested area of approximately 102,500 acres within the central and eastern portions of Suffolk County; this area has an extensive history and ongoing risk of frequent wildfire. Figure 5.4.12-8 shows a detailed map of the Central Pine Barrens, which include parts of the Towns of Brookhaven, Riverhead, and Southampton and is legally divided into a 55,000 acre Core Preservation Area and a 47,500 acre Compatible Growth Area (Central Pine Barren Wildfire Task Force, 1999). Pre-fire planning and wildfire suppression in the area are coordinated by the Central Pine Barrens Wildfire Task Force, which maintains a Fire Management Plan (finalized in 1999) that provides a comprehensive evaluation of the issues associated with wildfire in the Central Pine Barrens.

Figure 5.4.12-8. Central Pine Barrens Area Detail



Source: Central Pine Barrens Commission 2014

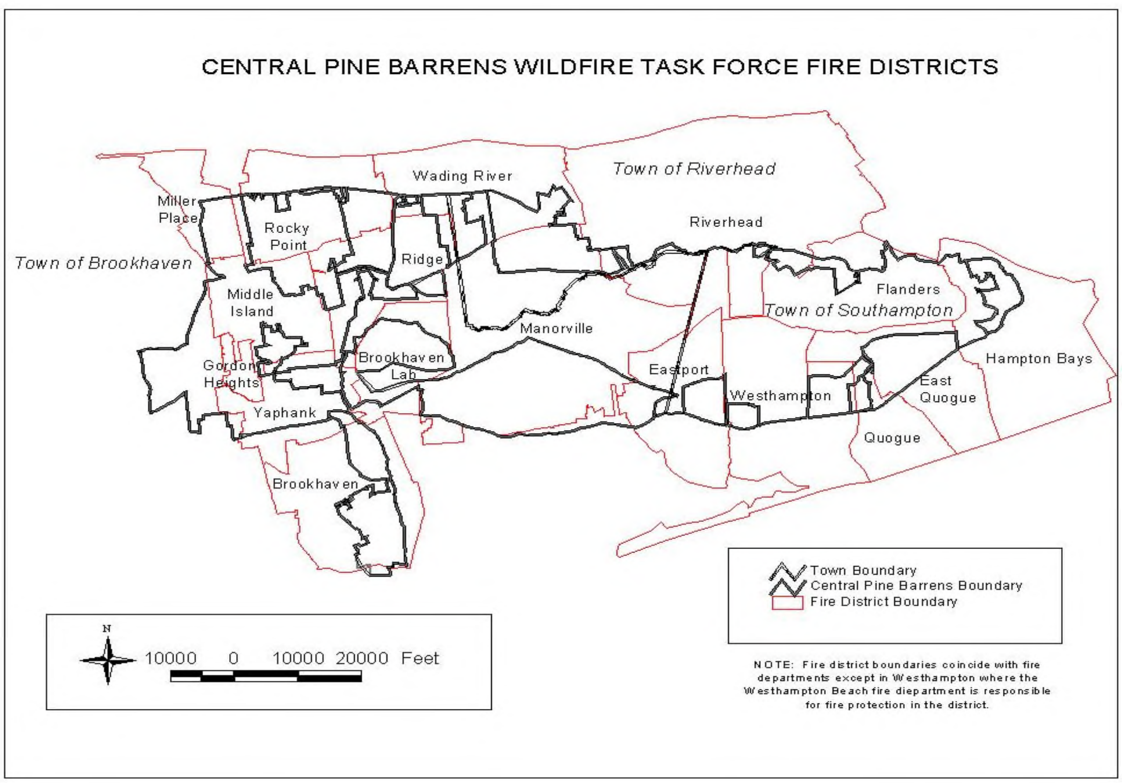
At the center of the Central Pine Barrens is a mosaic of forests, coastal plain ponds, marshes, and streams. The three forest types, pitch pine-tree oak (covering approximately 35-percent), tree oak-pitch pine (55-percent), and pitch pine-scrub oak-heath woodlands and shrublands (7-percent), are predominantly fire dependent (meaning that many of the species have adapted to and depend on periodic fire for long-term survival) (Kurtz, 2007). Pine Barrens are found on quick-draining soils with low nutrient content and high acidity. To help retain moisture, many of the plant species produce waxes and resins, which also are flammable (Brookhaven National Laboratory, 2003). During periods of above average temperatures and below average rainfall and humidity, high resin content (which increases ignition potential, flammability, and fire intensity) and rapid drying rates, can result in extreme fire dangers. Pitch pines are able to survive most fires due to their thick, insulating bark and ability to rapidly sprout from buds in the trunk and root collar.

The Central Pine Barrens contains one of the greatest concentrations of endangered, threatened, and special concern plant and animals species in New York State and provides recharge to the aquifer from which Long Island draws significant portions of its drinking water. There are approximately 1,000 annual wildfires in the Central Pine Barrens; as many as 75 brush fires may occur on a spring day. Over 95% of these fires are estimated to be anthropogenic (started by humans), including both accidental fires and arson.

Figure 5.4.12-9 shows the boundaries of those fire districts serving the Central Pines Barrens. The 17 fire districts whose jurisdiction includes some portion of the Core Preservation Area of the Central Pine Barrens (as defined by the State) include:

- Brookhaven Fire District
- Quogue Fire District
- East Quogue Fire District
- Ridge Fire District
- Eastport Fire District
- Riverhead Fire District
- Flanders Fire District
- Rocky Point Fire District
- Gordon Heights Fire District
- Wading River Fire District
- Hampton Bays Fire District
- Westhampton Beach Fire District
- Manorville Fire District
- Westhampton Fire Protection District
- Middle Island Fire District
- Yaphank Fire District
- Miller Place Fire District (Central Pine Barrens Wildfire Task Force, 1999)

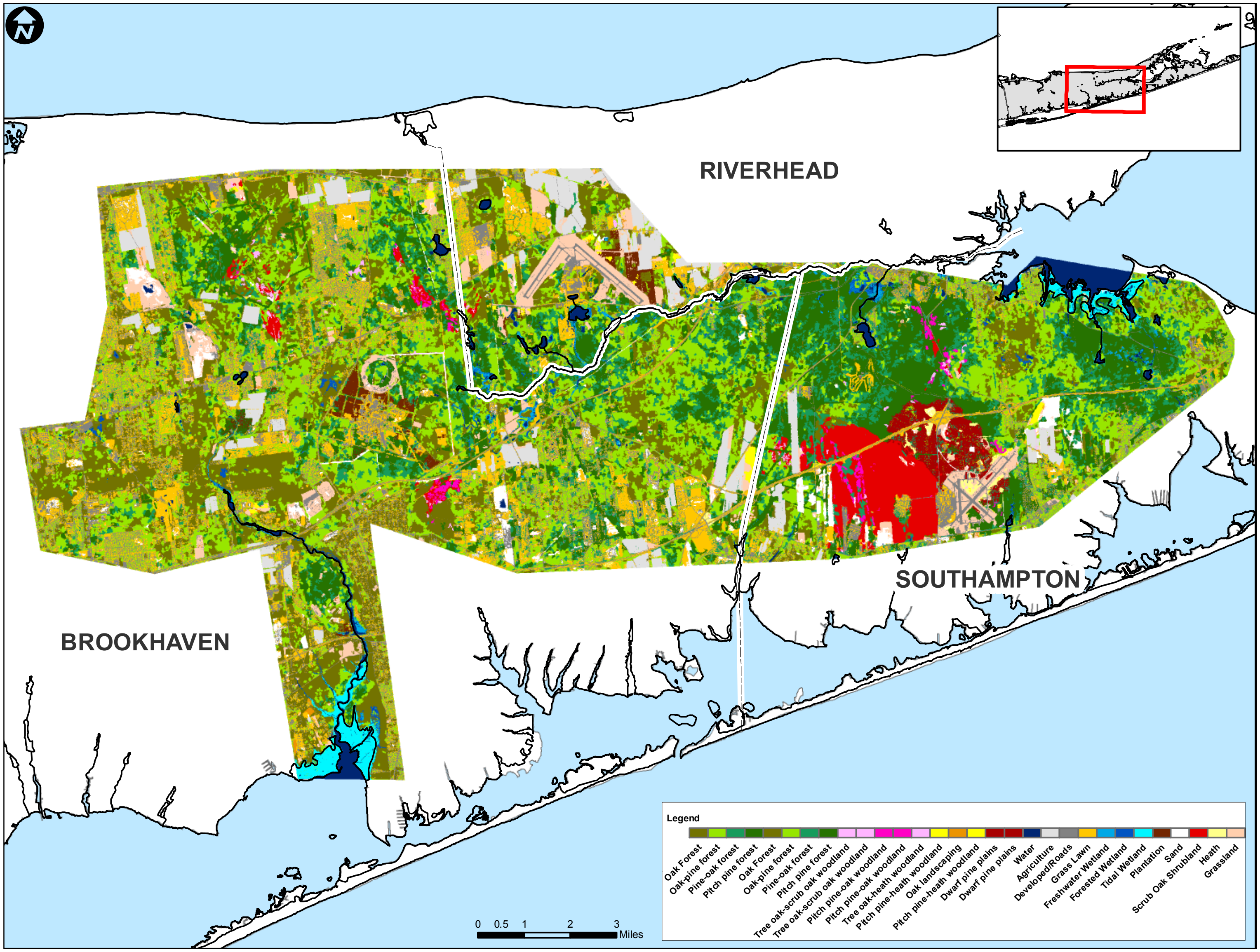
Figure 5.4.12-9. Central Pine Barrens Fire District Boundaries



Source: Central Pine Barrens Wildfire Task Force, 1999

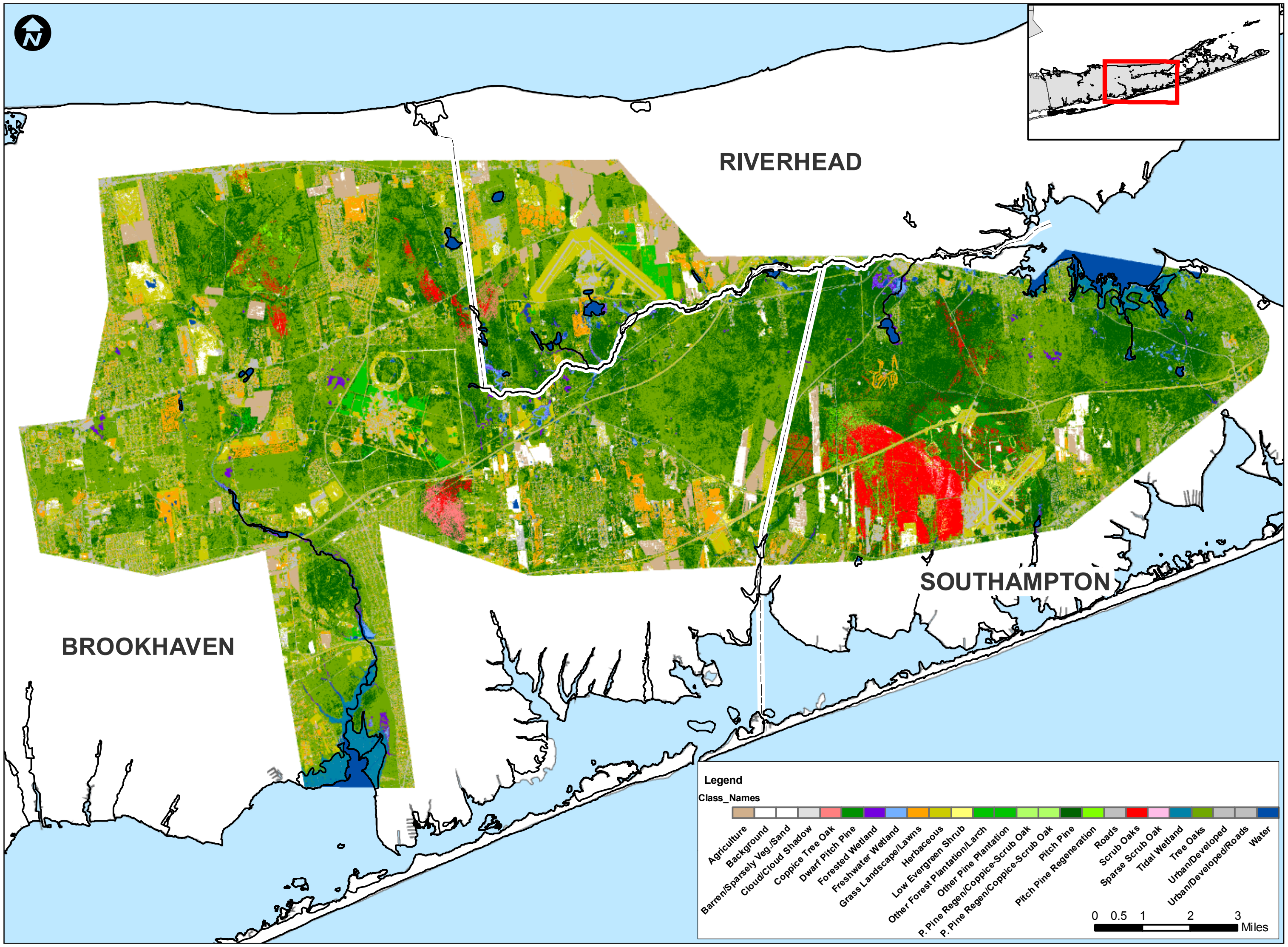
Figure 5.4.12-10 and Figure 5.4.12-11 illustrate Pine Barren vegetative communities and cover types for the Central Pine Barrens area in relation to towns and villages participating in the Suffolk County hazard mitigation planning process. These figures illustrate specific areas in the Central Pine Barrens that have a higher relative risk based on vegetation type (including factors such as resin content, ability to retain moisture, and proximity to occupied structures).

Figure 5.4.12-10. Central Pine Barrens Vegetative Communities



Source: The Nature Conservancy Eastern Heritage Task Force

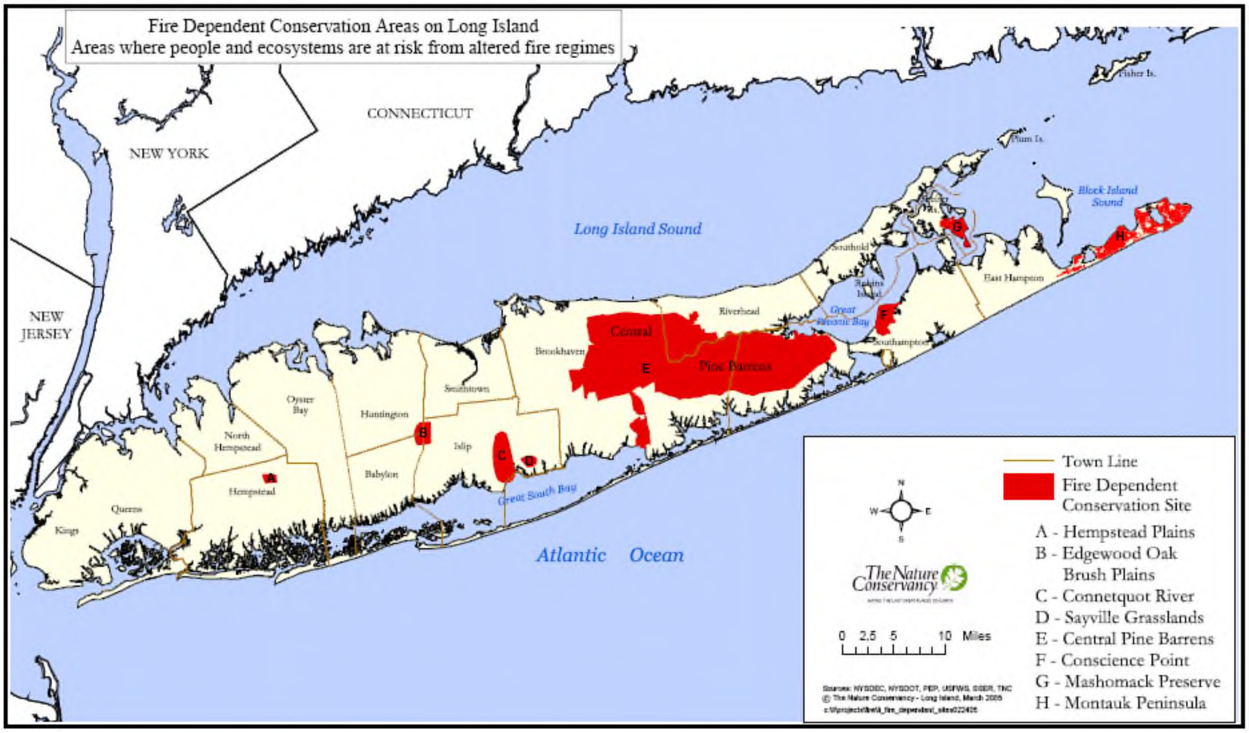
Figure 5.4.12-11. Central Pine Barrens Land Cover Types



Source: The Nature Conservancy Eastern Heritage Task Force

In addition to the Central Pine Barrens, there are several other wildfire hazard areas identified as "at risk" to the wildfire hazard by The Nature Conservancy. These areas include Edgewood Oak Brush Plains, Connetquot River, Sayville Grasslands, Conscience Point, Mashomack Preserve and Montauk Peninsula (Figure 5.4.12-12).

Figure 5.4.12-12. Fire Dependent Conservation Areas on Long Island



Source: The Nature Conservancy Eastern Heritage Task Force

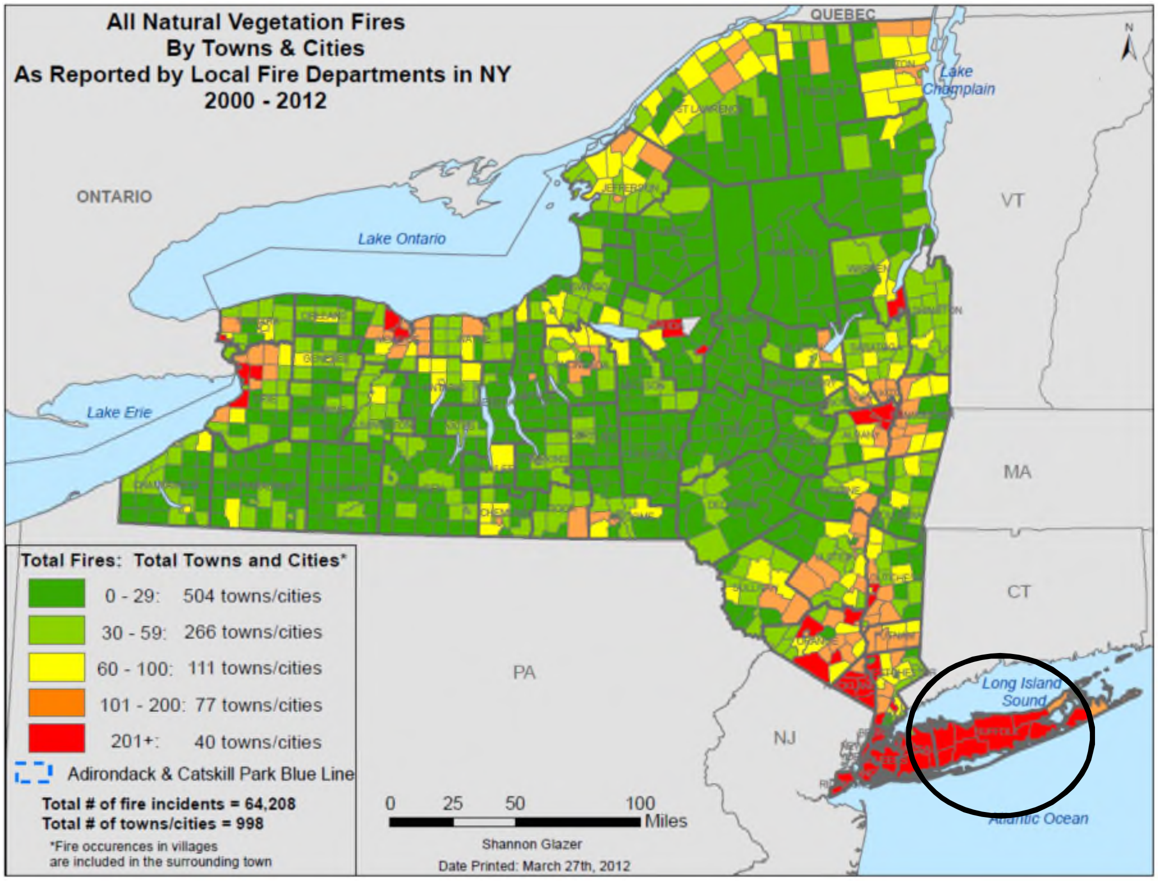
Previous Occurrences and Losses

The short-term effects of wildfires can include destruction of timber, forest, wildlife habitats, scenic vistas, and watersheds. Business and transportation disruption can also occur in the short-term. Long-term effects can include reduced access to recreational areas, destruction of community infrastructure and cultural and economic resources (USGS, 2006).

Wildfire occurrence in New York State is based on two data sources – the New York State Forest Ranger force and the New York State Office of Fire Prevention and Control. The New York State Forest Ranger is a division of the NYSDEC. It has fought fires and retained records for over 125 years. Over the past 25 years (1988-2012), Ranger Division records indicate that rangers suppressed 6,971 wildfires that burned a total of 67,273 acres. NYS Office of Fire Prevention and Control (OFP&C) indicates that from 2002 through 2012, fire departments throughout New York responded to 64,208 wildfires, brush fires, grass fires or other outdoor fires (NYSDEC, 2013).

According to the Ranger Division wildfire occurrence data from 1988 through 2012, 95-percent of wildfires in the State were human-caused. Debris burning accounted for 35-percent; arson accounted for 17-percent; campfires accounted for 13-persent; children accounted for 5-percent; smoking, equipment, and railroads accounted for 30-percent; and lightning accounted for 5-percent of all wildfires (NYSDEC, 2013). Figure 5.4.12-13 illustrates the occurrences of wildfires in New York State, between 2000 and 2012.

Figure 5.4.12-13. Wildfire Occurrences in New York State, 2000-2012



Source: NYSDEC, 2013
Note: The black circle indicates the location of Suffolk County.

In 2012, the NYSDEC reported that 2,146 acres burned due to 177 wildfire events. There were 11 prescribed burns that burned a total of 267 acres (NYSDEC, 2012).

For this 2014 Plan Update, known wildfire events that have impacted Suffolk County between 2008 and 2013 are identified in Table 5.4.12-2. Events identified in the 2007 Plan are included in Appendix H. However, Table 5.4.12-2 may not include a complete record of all wildfire events that have occurred in the County.

Table 5.4.12-2. Wildfire Events between 2008 and 2013

Dates of Event	Event Type	FEMA Declaration Number	Location / County Designated?	Losses / Impacts
April 6, 2012	Wildfire	N/A	N/A	The East Quogue, Flanders, Riverhead, and Westhampton Beach, Fire Departments responded to a brush fire on Pleasure Drive. A combination of strong winds and low humidity added to the fire. The fire is currently being investigated by the Southampton Town Fire marshal
April 9, 2012	Wildfire (Crescent Bow Fire)	N/A	N/A	This was the largest wildfire in New York State and occurred on Long Island. The 992-acre wildfire burned through the central pine barrens area of Suffolk County and destroyed three homes and a fire engine. It was determined that this wildfire was caused by incendiary activity and no arrests were made. The Southampton Fire Department responded to this fire.
April 15, 2012	Brush and Mulch Fire	N/A	N/A	More than 100 firefighters were on scene at a mulch and brush fire off Speonk-Riverhead Road in the hamlet of Eastport.
July 17, 2013	Brush Fire	N/A	N/A	A brush fire occurred in the hamlet of Shinnecock Hills at the end of Black Watch Court.

Sources: CPBFMP; NCEHTF; FEMA; NYS DHSES; WBFD; NYSDEC; SFD
Note: Monetary figures within this table were U.S. Dollar (USD) figures calculated during or within the approximate time of the event. If such an event would occur in the present day, monetary losses would be considerably higher in USDs as a result of inflation.

CPBFMP	Central Pine Barren Fire Management Plan
EM	Emergency Declaration
FEMA	Federal Emergency Management Agency
FM	Fire Management Assistance Declaration
HMP	Hazard Mitigation Plan
K	Thousand ($)
M	Million ($)
N/A	Not Applicable
NCEHTF	The Nature Conservancy Eastern Heritage Task Force
NCDC	National Climatic Data Center
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PA	Public Assistance
SFD	Southampton Fire Department
WBFD	Westhampton Beach Fire Department

Probability of Future Events

According to the New York State Forest Ranger Division, wildfire occurrence data from 1988 to 2012 have shown that New York State, including Suffolk County, will always be susceptible to wildfires. Ninety-five percent of wildfires in New York State are caused by humans, while lightning is responsible for only five percent. Beginning in 2010, New York State enacted revised open burning regulations that ban brush burning statewide from March 15th through May 15th. This time period is when 47% of all fire department-response wildfires occur. Forest ranger data indicates that this new statewide ban resulted in 74% fewer wildfires caused by debris burning in upstate New York from 2010 to 2012. Debris burning has been prohibited in New York City and Long Island for more than 40 years. Since compliance with this regulation, forest ranger and fire department historical fire occurrence data will serve as a benchmark for analysis of wildfire occurrence (NYS DHSES, 2013).

The State's large size, diverse topography, and variety of climates require the State be divided into distinct units for describing wildfire potential and risk. See the Location section of this profile for information regarding the risk areas (NYS DHSES, 2013).

New York State identified the Central Pine Barrens as one of its highest wildfire hazard areas. It consists of 100,000 acres covering portions of the Towns of Brookhaven, Riverhead, and Southampton in Suffolk County. The New York State HMP indicates that the Long Island Pine Barrens are the second largest in size within the County; therefore, prone to larger wildland fires (NYS DHSES, 2013).

Fire probability depends on local weather conditions, outdoor activities (e.g. camping, debris burning, and construction), and the degree of public cooperation with fire prevention measures. Dry weather, such as drought, can increase the likelihood of wildfire events. Lightning can also trigger wildfire and urban fire events. Other natural disasters can increase the probability of wildfires by producing fuel in both urban and rural areas. Forest damage from hurricanes and tornadoes may block interior access roads and fire breaks; pull down overhead power lines; or damage pavement and underground utilities (NVRC, 2006).

Wildfire experts say there are four reasons why wildfire risks are increasing:

- Fuel, in the form of fallen leaves, branches and plant growth, have accumulated over time on the forest floor. Now this fuel has the potential to "feed" a wildfire.
- Increasingly hot, dry weather in the U.S.
- Changing weather patterns across the country.
- More homes built in the areas called the Wildland/Urban Interface, meaning homes are built closer to wildland areas where wildfires can occur (NYS DHSES, 2011).

It is likely that New York State will experience small wildfires throughout the state on a yearly basis (as the State has regularly experienced in the past). However, advanced methods of wildfire management and control and a better understanding of the fire ecosystems should reduce the number of devastating fires in the future (NYS DHSES, 2011).

In Section 5.3, the identified hazards of concern for Suffolk County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for wildfire in the County is considered 'occasional' (event that occurs from once in 10 years to once in 100 years, as presented in Table 5.3-3).

Climate Change Impacts

Climate change directly and indirectly affects the growth and productivity of forests: directly due to changes in atmospheric carbon dioxide and climate, and indirectly through complex interactions in forest ecosystems. Climate also affects the frequency and severity of many forest disturbances, such as infestations, invasive species, wildfires, and storm events. As temperatures increase, the suitability of a habitat for specific types of trees changes. There is also evidence that prolonged heat waves are likely to lead to a greater number of wildfire incidents. Stronger winds from larger storms may lead to more fallen branches for wildfires to consume. An increase in rain and snow events primes forests for fire by growing more fuel. Drought and warmer temperatures lead to drier forest fuels (NYS HMP, 2014).

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue growing. Impacts related to increasing temperatures and sea level rise are already being felt in the State. ClimAID: the Integrated Assessment for Effective Climate Change in New York State (ClimAID) was undertaken to provide decision-makers with information on the State's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA], 2011).

Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Suffolk County is part of Region 4, New York City and Long Island. Some of the issues in this region, affected by climate change, include: the area contains the highest population density in the State; sea level rise and storm surge increase coastal flooding, erosion, and wetland loss; challenges for water supply and wastewater treatment; increase in heat-related deaths; illnesses related to air quality increase; and higher summer energy demand stresses the energy system (NYSERDA, 2011).

Temperatures and precipitation amounts are expected to increase throughout the State, as well as in Region 4. It is anticipated that by the 2020s, the State's temperature will rise between 1.5 and 3ºF; 3 to 5.5ºF by the 2050s; and 4 to 9ºF by the 2080s. The lower ends of these ranges are for lower greenhouse gas emissions scenarios and the higher ends for higher emission scenarios (NYSERDA, 2011). In Region 4, it is estimated that temperatures will increase by 3ºF to 5ºF by the 2050s and 4ºF to 7.5ºF by the 2080s (baseline of 53ºF).

Annual temperatures in New York State have been rising throughout the State since the start of the 20th century. State-average temperatures have increased by approximately 0.6°F since 1970, with winter warming exceeding 1.1°F per decade. Extreme heat events are likely to increase throughout New York State and short-duration warm season droughts will become more common.

With the increase in temperatures, heat waves will become more frequent and intense, increasing heat-related illness and death and posing new challenges to the energy system, air quality and agriculture. Summer droughts are projected to increase, affecting water supply, agriculture, ecosystems, and energy projects (NYSERDA, 2011).

Fire is determined by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot dry spells create the highest fire risk. With the increasing temperatures occurring in New York State, wildfire danger may intensify by warming and drying out vegetation. When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the wildfire hazard on Suffolk County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, safety and health, (2) general building stock, (3) critical facilities, (4) economy; (5) change of vulnerability and (5) future growth and development
- Effect on Climate Change on Vulnerability
- Change of vulnerability as compared to that presented in the 2008 Suffolk County Hazard Mitigation Plan
- Further data collections that will assist understanding of this hazard over time

Overview of Vulnerability

Wildfire hazards can impact significant areas of land, as evidenced by wildfires throughout the U.S. over the past several years. Fire in urban areas has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas. Wildfire, however can spread quickly, become a huge fire complex consisting of thousands of acres, and present greater challenges for allocating resources, defending isolated structures, and coordinating multi-jurisdictional response. If a wildfire occurs at a WUI, it can also cause an urban fire and in this case has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas.

For wildfire, the Central Pine Barrens is identified as the largest hazard area of concern. Additionally, The Nature Conservancy has identified several other wildfire hazard areas in Suffolk County including Edgewood Oak Brush Plains, Connetquot River, Sayville Grasslands, Conscience Point, Mashomack Preserve and Montauk Peninsula (Figure 5.4.12-10).

Data and Methodology

The WUI (interface and intermix) obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison was used to define the wildfire hazard areas. The University of Wisconsin-Madison wildland fire hazard areas are based on the 2010 Census and 2006 National Land Cover Dataset and the Protected Areas Database. For the purposes of this risk assessment, the high-, medium- and low-density interface areas were combined and used as the 'interface' hazard area and the high-, medium- and low-density intermix areas were combined and used as the 'intermix' hazard areas. Figure 5.4.12-5 through Figure 5.4.12-7 presented earlier in the profile displays the 2010 Wildfire Urban Interface for the U.S. and Suffolk County by 2010 U.S. Census block, respectively.

The asset data (population, building stock and critical facilities) presented in the County Profile (Section 4) was used to support an evaluation of assets exposed and the potential impacts and losses associated with this hazard. To determine what assets are exposed to wildfire, available and appropriate GIS data was overlaid upon the hazard area. The limitations of this analysis are recognized, and as such the analysis is only used to provide a general estimate.

Impact on Life, Health and Safety

As demonstrated by historic wildfire events in New York and other parts of the country, potential losses include human health and life of residents and responders, structures, infrastructure and natural resources. In addition, wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business and decrease in tourism. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment.

Wildfires can cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from work to fight these fires.

As a way to estimate the County's population vulnerable to the wildfire hazard, the population located within the WUI were overlaid upon the 2010 Census population data (U.S. Census, 2010). The Census blocks with their center within the hazard area were used to calculate the estimated population exposed to the wildfire hazard. Table 5.4.12-3 summarizes the estimated population exposed by municipality.

Table 5.4.12-3. Estimated Population Located within the WUI in Suffolk County

Jurisdiction	U.S. Census 2010 Population	Estimated Population Exposed			% of Total Exposed
		Intermix	Interface	Total	
Amityville (V)	9,523	0	0	0	0.0%
Asharoken (V)	654	0	0	0	0.0%
Babylon (T)	164,661	369	0	369	0.2%
Babylon (V)	12,166	4	0	4	0.0%
Belle Terre (V)	792	94	0	94	11.9%
Bellport (V)	2,084	0	0	0	0.0%
Brightwaters (V)	3,103	0	0	0	0.0%
Brookhaven (T)	434,886	27,114	100,899	128,013	29.4%
Dering Harbor (V)	11	0	0	0	0.0%
East Hampton (T)	18,205	6,411	10,616	17,027	93.5%
East Hampton (V)	1,083	99	360	459	42.4%
Greenport (V)	2,197	207	0	207	9.4%
Head of the Harbor (V)	1,472	599	0	599	40.7%
Huntington (T)	190,124	4,147	0	4,147	2.2%
Huntington Bay (V)	1,425	31	0	31	2.2%
Islandia (V)	3,335	0	3,176	3,176	95.2%
Islip (T)	328,989	341	57,704	58,045	17.6%
Lake Grove (V)	11,163	64	0	64	0.6%
Lindenhurst (V)	27,253	0	0	0	0.0%
Lloyd Harbor (V)	3,660	2,858	0	2,858	78.1%
Mastic Beach (V)	12,930	532	5,445	5,977	46.2%
Nissequogue (V)	1,749	1,461	0	1,461	83.5%
North Haven (V)	833	352	186	538	64.6%
Northport (V)	7,401	0	0	0	0.0%
Ocean Beach (V)	79	21	0	21	26.6%
Old Field (V)	918	564	0	564	61.4%
Patchogue (V)	11,798	32	0	32	0.3%

Jurisdiction	U.S. Census 2010 Population	Estimated Population Exposed			% of Total Exposed
		Intermix	Interface	Total	
Poquott (V)	953	6	0	6	0.6%
Port Jefferson (V)	7,750	160	0	160	2.1%
Quogue (V)	967	135	569	704	72.8%
Riverhead (T)	33,506	1,727	13,315	15,042	44.9%
Sag Harbor (V)	2,169	106	1,973	2,079	95.9%
Sagaponack (V)	313	22	188	210	67.1%
Saltaire (V)	37	10	0	10	27.0%
Shelter Island (T)	2,381	1,253	619	1,872	78.6%
Shoreham (V)	531	128	403	531	100.0%
Smithtown (T)	112,773	2,267	0	2,267	2.0%
Southampton (T)	49,130	11,040	27,439	38,479	78.3%
Southampton (V)	3,109	9	2,412	2,421	77.9%
Southold (T)	19,771	1,874	0	1,874	9.5%
Village of the Branch (V)	1,807	0	1,412	1,412	78.1%
West Hampton Dunes (V)	55	0	0	0	0.0%
Westhampton Beach (V)	1,721	21	0	21	1.2%
Shinnecock Tribal Nation	662	573	1	574	86.7%
Unkechaug Tribal Nation	324	0	0	0	0.0%
Suffolk County	**1,493,350**	**64,631**	**226,717**	**291,348**	**19.5%**

Source: U.S. Census 2010; Radeloff et al, 2005

Impact on General Building Stock

The most vulnerable structures to wildfire events are those within the WUI. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. To estimate the buildings exposed to the wildfire hazard, the WUI was overlaid upon the updated building inventory at the structure level. The replacement cost value of the structures with their center in the WUI were totaled. Table 5.4.12-4 summarizes the estimated building stock inventory exposed by municipality.

Table 5.4.12-4. Building Stock Replacement Value Located within the WUI in Suffolk County

Jurisdiction	Total RV (Structure and Contents)	Building RV Exposed			% of Total Exposed
		Intermix	Interface	Total	
Amityville (V)	$4,252,136,181	$0	$0	$0	0.0%
Asharoken (V)	$372,107,179	$74,820,426	$0	$74,820,426	20.1%
Babylon (T)	$65,453,076,501	$343,178,963	$0	$343,178,963	0.5%
Babylon (V)	$4,543,925,987	$0	$0	$0	0.0%
Belle Terre (V)	$669,659,013	$94,727,867	$0	$94,727,867	14.1%
Bellport (V)	$1,916,728,157	$0	$0	$0	0.0%
Brightwaters (V)	$1,513,218,570	$0	$0	$0	0.0%
Brookhaven (T)	$190,143,257,364	$15,675,420,424	$37,705,830,248	$53,381,250,672	28.1%
Dering Harbor (V)	$50,907,547	$12,803,614	$0	$12,803,614	25.2%
East Hampton (T)	$14,753,173,216	$5,732,753,631	$6,676,527,919	$12,409,281,550	84.1%
East Hampton (V)	$2,592,657,128	$315,916,330	$593,067,642	$908,983,972	35.1%
Greenport (V)	$959,195,848	$13,888,100	$0	$13,888,100	1.4%
Head of the Harbor (V)	$1,460,689,661	$522,785,357	$0	$522,785,357	35.8%

Jurisdiction	Total RV (Structure and Contents)	Building RV Exposed			% of Total Exposed
		Intermix	Interface	Total	
Huntington (T)	$87,620,284,012	$2,422,005,274	$0	$2,422,005,274	2.8%
Huntington Bay (V)	$824,147,761	$31,454,412	$0	$31,454,412	3.8%
Islandia (V)	$3,165,387,995	$0	$1,661,557,122	$1,661,557,122	52.5%
Islip (T)	$116,722,805,765	$552,171,408	$22,042,094,520	$22,594,265,929	19.4%
Lake Grove (V)	$4,981,641,857	$15,150,018	$0	$15,150,018	0.3%
Lindenhurst (V)	$7,338,416,625	$0	$0	$0	0.0%
Lloyd Harbor (V)	$2,454,429,712	$1,933,338,081	$0	$1,933,338,081	78.8%
Mastic Beach (V)	$3,233,984,869	$138,232,789	$1,531,465,248	$1,669,698,037	51.6%
Nissequogue (V)	$3,556,614,754	$3,449,174,873	$0	$3,449,174,873	97.0%
North Haven (V)	$1,038,696,076	$598,399,276	$244,279,200	$842,678,476	81.1%
Northport (V)	$3,098,715,281	$0	$0	$0	0.0%
Ocean Beach (V)	$506,864,928	$109,129,060	$0	$109,129,060	21.5%
Old Field (V)	$999,833,880	$959,761,165	$0	$959,761,165	96.0%
Patchogue (V)	$5,365,465,598	$9,729,976	$0	$9,729,976	0.2%
Poquott (V)	$613,660,785	$1,585,030	$0	$1,585,030	0.3%
Port Jefferson (V)	$4,974,246,594	$137,076,534	$0	$137,076,534	2.8%
Quogue (V)	$2,538,333,603	$418,624,500	$836,577,208	$1,255,201,708	49.4%
Riverhead (T)	$20,620,083,411	$1,354,533,450	$6,611,881,003	$7,966,414,453	38.6%
Sag Harbor (V)	$2,555,414,041	$65,841,353	$2,463,061,655	$2,528,903,008	99.0%
Sagaponack (V)	$1,538,825,257	$32,456,100	$782,456,464	$814,912,564	53.0%
Saltaire (V)	$577,966,672	$258,825,594	$0	$258,825,594	44.8%
Shelter Island (T)	$2,627,033,680	$1,199,148,077	$853,923,941	$2,053,072,018	78.2%
Shoreham (V)	$444,350,589	$97,007,832	$347,342,756	$444,350,589	100.0%
Smithtown (T)	$72,444,940,121	$2,215,187,959	$0	$2,215,187,959	3.1%
Southampton (T)	$38,161,684,004	$10,670,289,786	$18,294,540,572	$28,964,830,358	75.9%
Southampton (V)	$5,883,613,602	$171,706,107	$2,824,080,792	$2,995,786,899	50.9%
Southold (T)	$15,067,456,341	$1,874,692,180	$0	$1,874,692,180	12.4%
Village of the Branch (V)	$1,314,993,732	$0	$0	$0	0.0%
West Hampton Dunes (V)	$309,912,300	$0	$0	$0	0.0%
Westhampton Beach (V)	$2,752,056,759	$33,423,012	$1,233,225,001	$1,266,648,013	46.0%
Shinnecock Tribal Nation	$473,022,431	$411,889,085	$13,553,312	$425,442,398	89.9%
Unkechaug Tribal Nation	$76,936,042	$0	$0	$0	0.0%
Suffolk County	**$702,562,551,430**	**$51,947,127,642**	**$104,715,464,606**	**$156,662,592,247**	**22.3%**

Source: Suffolk County Department of Planning; Suffolk County Real Property Tax Service Agency; Radeloff et al, 2005
Notes: GBS = General Building Stock; RV = Replacement Value; WUI = Wildland Urban Interface

Table 5.4.12-5 provides the estimated parcel status by ownership and land use for the Core Preservation Area in the Central Pine Barrens. The areas and resources identified here are considered vulnerable to the damages from wildfire.

Table 5.4.12-5. Central Pine Barrens Core Preservation Area – Estimated Parcel Status by Ownership and Land Use in Acres, 2004

Ownership / Land Use	Town of Brookhaven	Town of Riverhead	Town of Southampton	Total
Protected Lands				
Suffolk County	6,401	1,912	11,738	20,050

Ownership / Land Use	Town of Brookhaven	Town of Riverhead	Town of Southampton	Total
New York State	8,886	1,119	3,475	13,479
Unites States	2,528	0	182	2,710
Town	946	60	730	1,736
Nature Conservancy	0	58	178	236
Misc. Private	27	0	178	205
Pine Barrens Comm. Easement	371	37	73	480
Sub Total	**19,159**	**3,185**	**16,554**	**38,898**
Developed Lands by Land Use Code				
Residential (200)	798	176	378	1,352
Commercial (400)	193	23	123	338
Entertainment (500)	172	522	284	978
Commercial Services (600)	5,279	0	416	5,694
Industrial (700)	0	21	100	121
Private Club (900)	77	73	0	149
Sub Total	**6,518**	**814**	**1,301**	**8,632**
Utilities / Transportation (800) Combined Total (Rail, Airport, Phone, Water Authority, etc)	150	617	305	1,072
Agricultural (100)	336	57	140	533
Other Ownership Categories including Grandfathered Parcels, Hardship Exemptions, Roadfront Exemptions, Private, Vacant, Unprotected and Otherwise Not Categorized Above	1,426	536	2,542	4,503
Total	**27,589**	**5,208**	**20,842**	**53,638**

Source: Central Pine Barrens, 2007

Note: Land use codes are from the Property Type Classification and Ownership Codes produced by the State Board of Equalization and Assessment (Albany, NY, 1990; now known as the Office of Real Property Services). Actual built roadways are not included in the above data, as they are not assigned tax map parcel numbers or acreages. It is estimated that there may be approximately 3,000 acres of such roads in the core area.

Impact on Critical Facilities

It is recognized that a number of critical facilities are located in the wildfire hazard area, and are also vulnerable to the threat of wildfire. Many of these facilities are the locations for vulnerable populations (i.e., schools, senior facilities) and responding agencies to wildfire events (i.e., fire, police). Table 5.4.12-6 summarizes critical facilities located within the wildfire hazard area by jurisdiction.

Table 5.4.12-6. Facilities in the WUI (Intermix or Interface) in Suffolk County

Jurisdiction	Facility Types																				
	Airport	Bus	Care	Communication	DPW\DOT	Electric Power	Electric Substation	EOC	Ferry	Fire	Historic	Military	Municipal	POD	Police	Potable Water	Rail	Suffolk County	School	Senior	Tribal	Wastewater
Brookhaven (T)	0	0	0	9	1	0	8	0	0	21	0	0	0	1	1	38	2	4	23	3	0	32
Dering Harbor (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
East Hampton (T)	2	0	0	5	2	1	5	0	1	3	0	1	0	1	1	31	2	1	6	0	0	2
East Hampton (V)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Head of the Harbor (V)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Huntington (T)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	2
Islandia (V)	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	3	0	3	1	0	0	1
Islip (T)	0	0	0	1	2	0	3	0	0	9	0	0	0	1	1	22	3	0	19	2	0	9
Lloyd Harbor (V)	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	4	0	0	4	0	0	0
Mastic Beach (V)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Nissequogue (V)	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0
North Haven (V)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Old Field (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Quogue (V)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Riverhead (T)	0	0	0	3	1	0	1	0	0	5	0	1	1	2	1	6	1	14	5	3	0	11
Sag Harbor (V)	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2	3	0	1	9	0	0	1
Sagaponack (V)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0

Jurisdiction	Facility Types																				
	Airport	Bus	Care	Communication	DPWDOT	Electric Power	Electric Substation	EOC	Ferry	Fire	Historic	Military	Municipal	POD	Police	Potable Water	Rail	Suffolk County	School	Senior	Tribal	Wastewater
Shelter Island (T)	0	0	1	0	0	0	0	1	6	3	0	0	1	3	1	2	0	6	1	0	0	0
Shinnecock Tribal Nation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
Shoreham (V)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Smithtown (T)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Southampton (T)	0	0	0	30	8	1	4	0	0	13	0	0	1	5	4	52	6	16	28	14	2	9
Southampton (V)	0	0	1	2	0	0	1	0	0	1	0	0	1	0	1	2	1	2	2	2	0	1
Southold (T)	1	0	0	0	0	2	2	0	0	1	0	0	0	0	0	20	0	0	0	1	0	1
Westhampton Beach (V)	0	0	0	2	1	0	0	0	0	2	0	0	1	0	1	0	0	3	1	3	0	0
Suffolk County	**3**	**0**	**2**	**55**	**15**	**4**	**27**	**1**	**7**	**62**	**1**	**2**	**11**	**13**	**16**	**190**	**15**	**51**	**110**	**28**	**16**	**71**

Source: Radeloff et al, 2005

Several of the planning partners including the Town of Smithtown, the Suffolk County Water Authority, the Unkechaug Tribal Nation, and the Shinnecock Tribal Nation provided specific parcel data for identified critical properties. More specifically, the Tribal Nations provided the location of sacred land. An exposure analysis was completed to identify the amount of land exposed. Table 5.4.12-7 below summarizes results of the exposure analysis.

Table 5.4.12-7. Planning Partner Property Specific Exposure Analysis

Jurisdiction	Total Acres of Critical Properties	*Entity Acreage				% of Total Critical Property Exposed			
		ST Parks	SCWA	ST Recharge	Tribe SL	ST Parks	SCWA	STr Rcharge	Tribe SL
Brookhaven (T)	458	0	198	0	0	0.0%	43.3%	0.0%	0.0%
East Hampton (T)	939	0	149	0	0	0.0%	15.9%	0.0%	0.0%
Huntington (T)	91	0	7	0	0	0.0%	8.0%	0.0%	0.0%
Islandia (V)	23	0	15	0	0	0.0%	64.2%	0.0%	0.0%
Islip (T)	234	0	53	0	0	0.0%	22.8%	0.0%	0.0%
Lloyd Harbor (V)	4	0	4	0	0	0.0%	100.0%	0.0%	0.0%
Nissequogue (V)	137	33	0	3	0	24.1%	0.0%	1.8%	0.0%
Patchogue (V)	12	0	8	0	0	0.0%	65.0%	0.0%	0.0%
Sag Harbor (V)	13	0	13	0	0	0.0%	100.0%	0.0%	0.0%
Shinnecock Tribal Nation	37	0	0	0	37	0.0%	0.0%	0.0%	100.0%
Shoreham (V)	1	0	1	0	0	0.0%	100.0%	0.0%	0.0%
Smithtown (T)	1,751	152	2	11	0	8.7%	0.1%	0.6%	0.0%
Southampton (T)	275	0	165	0	0	0.0%	59.9%	0.0%	0.0%
Southampton (V)	3	0	3	0	0	0.0%	100.0%	0.0%	0.0%
Southold (T)	257	0	120	0	0	0.0%	46.6%	0.0%	0.0%
Westhampton Beach (V)	3	0	0	0	0	0.0%	11.8%	0.0%	0.0%

Source: FEMA, Town of Smithtown, Suffolk County Water Authority, The Unkechaug Tribal Nation, and The Shinnecock Tribal Nation

*Note: SCWA- Suffolk County Water Authority, ST Parks- Smithtown Parks, ST Recharge- Smithtown Recharge Basins Tribe SL- Tribal Sacred Land

Impact on the Economy

The Central Pine Barrens Wildfire Task Force indicates that wildfires damage hundreds, sometimes thousands, of acres in the Pine Barrens each year. These fires jeopardize homes and businesses in the wildland-urban interface. These fires cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from work to fight these fires. These fires often cause injury to both civilians and firefighters and may cause damage to structures as well (Central Pine Barrens, 2007).

It is recognized that a number of critical facilities, transportation and utility assets are located in the Central Pine Barrens, and may be vulnerable to the threat of wildfire. Of particular note, the Long Island Expressway and the Long Island Railroad are two major east-west transportation arteries that were closed during the 1995 wildfires.

Effect of Climate Change on Vulnerability

According to the U.S. Fire Service (USFS), climate change will likely alter the atmospheric patterns that affect fire weather. Changes in fire patterns will, in turn, impact carbon cycling, forest structure, and species composition. Climate change associated with elevated greenhouse gas concentrations may create an atmospheric and fuel environment that is more conductive to large, severe fires (USFS, 2011). Under a changing climate, wildfires are expected to increase by 50% across the U.S. (USFS, 2013).

According to the New York State 2014 HMP Update, climate change can impact drought and extreme heat, causing drier conditions, which can lead to an increased number of wildfire events. During several drought events in New York State, the NYSDEC were forced to close public lands for recreational uses and ban open-burning at State campgrounds. In Suffolk County during the July 1999 drought, the NYSDEC closed NYSDEC lands in Suffolk County for recreational users and were closed until the fire danger risk was lowered (NYS HMP, 2014).

Fire interacts with climate and vegetation (fuel) in predictable ways. Understanding the climate/fire/vegetation interactions is essential for addressing issues associated with climate change that include:

- Effects on regional circulation and other atmospheric patterns that affect fire weather
- Effects of changing fire regimes on the carbon cycle, forest structure, and species composition, and
- Complications from land use change, invasive species and an increasing wildland-urban interface (USFS, 2011).

It is projected that higher summer temperatures will likely increase the high fire risk by 10 to 30-percent. Fire occurrence and/or area burned could increase across the U.S. due to the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conductive to surface drying, and fire-weather conditions, in general, which is conductive to severe wildfires. Warmer temperatures will also increase the effects of drought and increase the number of days each year with flammable fuels and extending fire seasons and areas burned (USFS, 2011).

Future changes in fire frequency and severity are difficult to predict. Global and regional climate changes associated with elevated greenhouse gas concentrations could alter large weather patterns, thereby affecting fire-weather conducive to extreme fire behavior (USFS, 2011).

Change of Vulnerability

The WUI (interface and intermix) obtained through the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison was not used for the 2008 HMP vulnerability assessment. Differences in exposure and potential losses estimated from the 2008 HMP and this update is mainly due to the difference in these wildfire hazard areas, as well the updated building stock inventory at the structure level and the release of the 2010 U.S. Census statistics.

Future Growth and Development

Areas targeted for potential future growth and development in the next five (5) years have been identified across Suffolk County at the jurisdiction level. Refer to the jurisdictional annexes in Volume II of this HMP. It is anticipated that any new development and new residents in the WUI will be exposed to the wildfire hazard. Refer to Figure 5.4.12-14 of the potential new development in the County and the WUI.

Additional Data and Next Steps

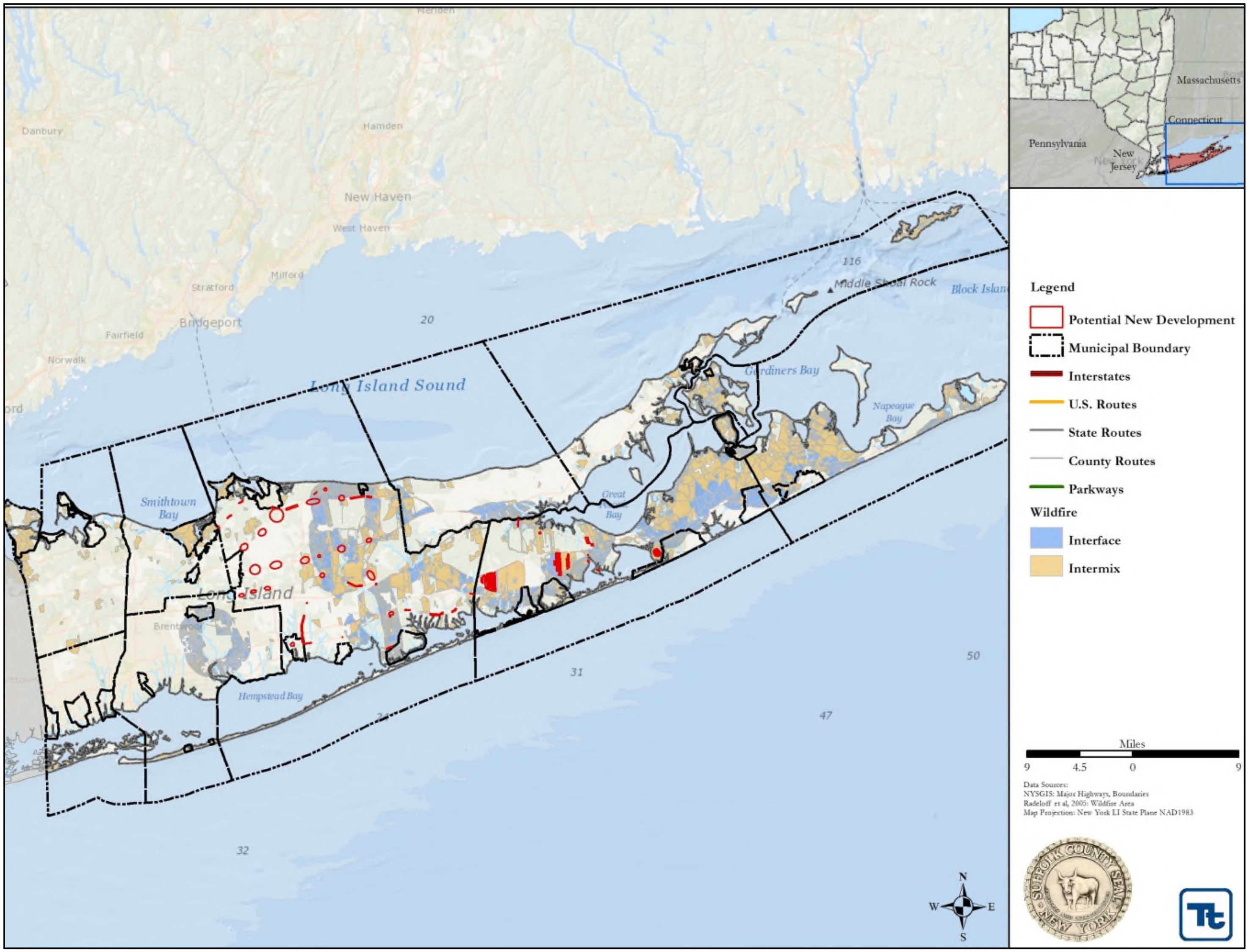
The custom building inventory developed for this Plan should be updated as data regarding the construction of structures, such as roofing material, fire detection equipment, structure age, etc. are available. As stated earlier, buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete. The proximity of these building types to the WUI should be identified for further evaluation. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and potential structural damages.

Several entities with ongoing wildfire management responsibilities in Suffolk County should be involved with any future data collection and analysis. These include the Central Pine Barrens Wildfire Task Force, The Nature Conservancy, Brookhaven National Laboratory, the 17 local fire jurisdictions through the Suffolk County Fire Chief's Council and Fire District Managers' Association, Suffolk County Office of Emergency Management and Fire Rescue and Emergency Services, New York State Department of Environmental Conservation Wildfire and Incident Management Academy, and New York State Emergency Management Office. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and economic damages, based on the population and resources exposed to the hazard.

WUI planning should include ongoing efforts to:

- Identify and map structures, resources, and property that require protection
- Use satellite imagery to create land cover and vegetation community maps outside of the legal boundary of the Central Pine Barrens
- Create land use regulations that encourage construction of defensible space and shaded fuelbreaks
- Create land use regulations that require firewise construction in the WUI
- Reduce fuel and create shaded fuel-breaks (including a combination of mechanical thinning and prescribed fire)
- Include public education campaigns to spread information to citizens at risk

Figure 5.4.12-14. Potential New Development and the WUI



Sources: Radeloff et al, 2005